SDSS-II First Year Review

Post-SDSS-II Operations

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The 2.5-m telescope, the two instruments, and the other ancillary equipment are all working well. The aged data-acquisition system has been recently replaced. We have an immense investment in software, and have acquired expertise in data handling.

Thus if a niche can be found for the unique attributes of the 2.5-m telescope (especially the 3-degree field of view for spectroscopy), it would be natural to consider operations beyond July 2008. The Astrophysical Research Consortium (ARC) is undergoing the following process:

1) Pre-proposals have been solicited from ARC, SDSS-II, and other institutions that we have identified as potentially interested. These were due on July 31 and are listed below. These pre-proposals cannot be complete because the observing time allocation needs to be iterated among the various ones that appear to be promising.

The pre-proposals address science, method, development work, team, and resources.

2) The pre-proposals are being evaluated by an ARC committee (technical/management) and by external mail reviewers (science). The mail reviews are due August 31.

The criteria include: science, technical feasibility, whether the project makes good use of the facilities, schedule, capabilities of the proposers, resonance with ARC long-term goals and interests, and whether the project is deemed to be fundable.

3) The ARC committee tries to assemble a "package" - it could be that, like SDSS-II, different projects can be intertwined. Some might start earlier and some might start later. Some may be able to share the focal plane (different sets of fibers sent to different spectrographs).

4) By early October, a recommendation for full proposal(s) is sent to the ARC Board of Governors. If approved, the ARC Board of Governors issues instructions for the development of the proposals and the approach to funding agencies.

The pre-proposals are:

A Massive Spectroscopic Survey of the Galaxy (G. Knapp, Princeton)

Similar science to SEGUE; idea is to expand surveyed region to complement Gaia, RAVE, and other "massive" Galactic-structure surveys. Uses current hardware (almost all spectroscopic, very little new imaging) and software. 6 years and 400,000 spectra per year.

Mapping the Cosmic Web of Baryons with HST/COS and the ARC 2.5-meter Imagers and Spectrographs

(J. Stocke, U. Colorado)

COS will measure absorption lines in the spectra of bright AGN, and the 2.5-m measures redshifts of all galaxies to a relatively faint limit in the angular vicinity. The correlation between the galaxies and the absorbers at low redshift reveals how baryons have been cycled between galaxies and the IGM.

Synoptic Spectroscopy of Young Stars (J. Bally, U. Colorado)

Spectroscopic (primarily) program that targets nearby young (< few 100 million years) stars to obtain a comprehensive picture of spectroscopic properties, including variability. One realization uses the current hardware to monitor 100,000 stars.

The Apache Point Observatory Galactic Evolution Experiment (APOGEE) wit the ARC H-band Echelle Spectrograph (ARCHES) (S. Majewski, U. Virginia)

R ~ 20000 H-band bench-mounted spectrograph to measure abundances and kinematics for late-type stars throughout the inner bulge and outer disk. 2MASS provides positions of targets. 100,000 stars (many of which are giants) in 3 years.

Refining the Distance Scale to 1% with the ARC 2.5-m Telescope (D. Schlegel, LBNL)

Measure baryon acoustic oscillation amplitude and angular scale via spectroscopy of luminous red galaxies (LRG's) as a probe of Dark Energy. Replace red CCD's and gratings in the SDSS spectrographs and replace fibers with 2-arcsec ones. This enables the 2.5-m telescope to measure LRG's to z = 0.7 over 10,000 sq. deg., 1 million redshifts in 4 years.

An All-Sky Extrasolar Planet Survey (ASEPS) with the ARC 2.5-meter Telescope (J. Ge, U. Florida)

An interferometer/spectrometer is being developed that accepts multiple objects (60 objects per interferometer). A five-year survey of 250,000 stars yields 10,000 new planets via precision radial velocity. The instrument is bench-mounted and thus the focal plane can be shared with other programs.

A Low-Redshift Supernova Survey Using the ARC 2.5m Telescope (A. Becker, U. Washington)

Scanning at a faster rate (with binning) enables more area to be covered and thus discovery of lower-redshift supernovae. The 10-month survey is expected to yield 250 Type Ia's in the interval $0.05 < z < 0.15$, complementing SDSS-II SN, and strengthening the overall SN constraint on Dark Energy.